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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,880	12/05/2001	Vijay A. Deshpande	12801.0083.NPUS04	5128

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EXAMINER

RIDLEY, BASIA ANNA

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/006,880

Applicant(s)

DESHPANDE, VIJAY A.

Examiner

Basia Ridley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-16 is/are pending in the application.
- 4a) Of the above claim(s) 12-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 March 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Newly submitted claims 12-16 are directed to inventions that are independent or distinct from the invention originally claimed and examined, for reasons as set forth below.
2. Claims 6-16 are drawn to distinct inventions, as set forth below, therefore a restriction to one of the following distinct inventions is required under 35 U.S.C. 121:
 - I. Claims 6-11, drawn to an autothermal reforming module, classified in class 48, subclass 127.9.
 - II. Claims 12-13, drawn to a desulfurization module, classified in class 422, subclass 198.
 - III. Claims 14-15, drawn to a water gas shift module, classified in class 48, subclass 128.
 - IV. Claim 16, drawn to a preferential oxidation module, classified in class 48, subclass 128.

The inventions are distinct, each from the other because of the following reasons:

3. Inventions I, II, III and IV are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention I has separate utility such as production of synthesis gas by autothermal reforming, invention II has separate utility such as sulfur removal, invention III has separate utility such as production additional hydrogen gas through water gas shift reaction, and invention IV has separate utility such as preferential combustion of CO from gas containing carbon monoxide and hydrogen. See MPEP § 806.05(d).

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4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

5. Because these inventions are distinct for the reasons given above and the search required for any one of the Groups is not required for any other Group, restriction for examination purposes as indicated is proper.

6. Since applicant has received an action on the merits for the originally presented invention I, claim(s) 6-11, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim(s) 12-16 have been withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Drawings

7. The drawings were received on 17 March 2005. These drawings are unacceptable, for the reasons as set forth below.

8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because Fig. 2 includes the reference character "101" not mentioned in the description.

9. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where

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necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

10. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

11. Claims 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cleary (USP 5,326,537) in view of McShea, III et al. (USP 4,483,691).

Regarding claims 6-11, Cleary discloses a module comprising:

- a module inlet (38) for receiving a feed stream;
- a module outlet (39) for producing an effluent stream;
- a fixed bed reactor (12) having a reactor inlet (17), a reactor outlet (25), and catalyst (15);
- an inlet spiral passage (36) in fluid communication with the module inlet (38) to the reactor inlet (17); and
- an outlet spiral passage (37) in fluid communication with the reactor outlet (25) to module outlet (39);
- a flow distribution manifold (13) in fluid communication with the reactor inlet (17) for evenly distributing flow into the reactor (12);

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- a flow collection manifold (16) in fluid communication with the reactor (12) for directing the hot reactor product to the reactor outlet (25).
- wherein the feed stream is introduced to the module inlet (38), passes through the inlet spiral passage (36) and is heated by the hot reactor product passing through the outlet spiral passage (37);
- wherein the catalyst includes supported catalyst particles (C3/L48-52);
- wherein the catalyst includes monoliths (C3/L48-52).

While Cleary discloses that the catalyst used in the catalytic reactor is a catalyst comprising a platinum group metal, typically comprised of platinum and/or palladium, deposited on high surface alumina substrate which in turn is deposited on a honeycomb support structure of stainless steel or ceramic (C1/L18-30 and C3/L48-52), the reference does not explicitly disclose said catalyst being used as an autothermal catalyst including a partial oxidation catalyst and a steam reforming catalyst.

McShea, III et al. teaches that platinum group metal, typically comprised of platinum and/or palladium, deposited on high surface alumina substrate which in turn is deposited on a honeycomb support structure of stainless steel or ceramic is a known autothermal catalyst (C5/L65-C7/L20 and C12/L16-50). Additionally the reference in Fig. 2, teaches that autothermal reforming can be successfully performed in a reactor (80) comprising said catalyst, wherein the reactor feed (72, 74) is preheated in an indirect heat exchanger (76) by reactor effluent (82). Therefore, to use the reactor and catalyst of Cleary for autothermal reforming would be obvious to one of ordinary skill in the art, because it would amount to nothing more than a use of a known catalyst and reactor for its intended use in a known environment to

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accomplish entirely expected result.

Regarding limitations recited in claim 6-11 which are directed to a manner of operating disclosed reactor, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Response to Arguments

12. Applicant's arguments filed on 17 March 2005 have been fully considered but they are not persuasive.

13. The applicant argues that Cleary does not disclose catalyst which can be used for autothermal reforming, and therefore an ordinary artisan would not use apparatus of Cleary for autothermal reforming of hydrocarbons. Additionally, the applicant argues that Cleary is not clear as to the composition of the oxidation catalyst used in disclosed reactor. This is not found persuasive. Cleary discloses a reactor comprising an oxidation catalyst core (15), without being limited to any specific oxidation catalyst. Additionally the reference discloses that known oxidation catalysts comprise platinum and/or palladium, deposited on high surface alumina substrate which in turn is deposited on a honeycomb support structure of stainless steel or ceramic (C1/L18-30 and C3/L48-52). From said disclosure, an ordinary artisan at the time of the invention would use any oxidation catalyst, including known oxidation catalyst as disclosed in C1/L18-30 and C3/L48-52 of the reference in the reactor of Cleary.

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While Cleary does not explicitly disclose said catalyst being an autothermal catalyst, it was known in the art at the time of the invention that catalyst comprising platinum group metal, typically platinum and/or palladium, deposited on high surface alumina substrate which in turn is deposited on a honeycomb support structure of stainless steel or ceramic is a known autothermal catalyst (as evidenced by McShea, III et al., C5/L65-C7/L20 and C12/L16-50). Therefore the catalyst disclosed by Cleary is capable of supporting autothermal reaction. The examiner notes that the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states “Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.”

14. Applicant argues that McShea, III et al. does not disclose a spiral heat exchanger combined with a reactor. This is not found persuasive because McShea, III et al. was not used to teach said structure. Said reference was merely used as evidence that catalyst disclosed in the apparatus of Cleary is capable of supporting autothermal reaction.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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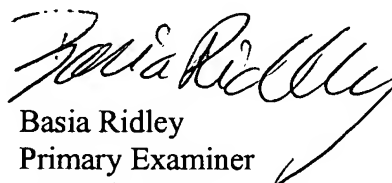
MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (571) 272-1453.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (571) 272-1444.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Technical Center 1700 General Information Telephone No. is (571) 272-1700. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).


Basia Ridley
Primary Examiner
Art Unit 1764

BR
May 31, 2005